

What is claimed:

1. A valve, comprising:

a valve body having a valve chamber and an inlet passage and an outlet passage in communication with the valve chamber;

a valve member positioned in the valve chamber and movable between an open position and a closed position, the valve member having a flow passage formed therethrough for providing fluid communication between the inlet passage and the outlet passage of the valve body when the valve member is in the open position; and

a seat assembly extending about the inlet passage and engaging the valve member, the seat assembly comprising:

an annular seat carrier having an annular groove formed therein; and

a seat positioned in and extending from the annular groove of the seat carrier, the seat having an inner side, an outer side, and a plurality of spaced apart, concentric seal rings extending from the inner side of the seat to the outer side thereof, the seal ring nearest the inner side of the seat being engageable with the valve member to provide an innermost seal when the seat assembly is acted upon by a pressure within a pressure range and the seal ring nearest the inner side of the seat being deflectable in a radially outward direction and out of sealing engagement with the valve member when the pressure exceeds the pressure range to cause the adjacent seal ring to provide the innermost seal.

2. The valve of claim 1 wherein each successive seal ring from the inner side of the seat to the outer side thereof is stiffer than the preceding seal ring.

3. The valve of claim 2 wherein each of the seal rings has a width and wherein the width of each seal ring is different from the width of the other seal rings.

4. The valve of claim 2 wherein each of the seal rings is made of a different material.

5. The valve of claim 1 wherein the outermost seal ring is supported by the seat carrier such that outward deflection of the outermost seal ring is prevented.

6. The valve of claim 1 wherein the seat carrier is made of metal and wherein at least a portion of the frusto-conical surface of the seat carrier is sealing engageable with valve member in the event of destruction of the seal rings.

7. The valve of claim 1 wherein each of the seal rings is separated from the adjacent seal ring by a substantially V-shaped notch.

8. The valve of claim 1 wherein at least the innermost seal ring is resilient.

9. A seat assembly for a valve, comprising:  
an annular seat carrier having an annular groove formed therein; and  
a seat positioned in and extending from the annular groove of the seat carrier, the seat having an inner side, an outer side, and a plurality of spaced apart, concentric seal rings extending from the inner side of the seat to the outer side thereof, the seal ring nearest the inner side of the seat being engageable with a valve member to provide an innermost seal when the seat assembly is acted upon by a pressure within a pressure range and the seal

ring nearest the inner side of the seat being deflectable in a radially outward direction and out of sealing engagement with the valve member when the pressure exceeds the pressure range to cause the adjacent seal ring to provide the innermost seal.

10. The seat assembly of claim 9 wherein each successive seal ring from the inner side of the seat to the outer side thereof is stiffer than the preceding seal ring.

11. The seat assembly of claim 10 wherein each of the seal rings has a width and wherein the width of each seal ring is different from the width of the other seal rings.

12. The seat assembly of claim 10 wherein each of the seal rings is made of a different material.

13. The seat assembly of claim 9 wherein the outermost seal ring is supported by the seat carrier such that outward deflection of the outermost seal ring is prevented.

14. The seat assembly of claim 9 wherein the seat carrier is made of metal and wherein at least a portion of the seat carrier is sealingly engageable with the valve member in the event of destruction of the seal rings.

15. The seat assembly of claim 9 wherein each of the seal rings is separated from the adjacent seal ring by a substantially V-shaped notch.

16. The seat assembly of claim 9 wherein at least the innermost seal ring is resilient.

17. A seat for a valve, comprising:  
a plurality of spaced apart, concentric seal rings, the seal ring nearest an inner side of the seat being engageable with a valve member to provide an innermost seal when the seat is acted upon by a pressure within a pressure range and the seal ring nearest the inner side of the seat being deflectable in a radially outward direction and out of sealing engagement with the valve member when the pressure exceeds the pressure range to cause the adjacent seal ring to provide the innermost seal.
18. The seat of claim 17 wherein each successive seal ring from the inner side of the seat to an outer side thereof is stiffer than the preceding seal ring.
19. The seat of claim 18 wherein each of the seal rings has a width and wherein the width of each seal ring is different from the width of the other seal rings.
20. The seat of claim 18 wherein each of the seal rings is made of a different material.
21. The seat of claim 17 wherein each of the seal rings is separated from the adjacent seal ring by a substantially V-shaped notch.
22. The seat of claim 17 wherein at least the innermost seal ring is resilient.

23. A valve, comprising:

a valve body having a valve chamber and an inlet passage and an outlet passage in communication with the valve chamber;

a valve member positioned in the valve chamber and movable between an open position and a closed position, the valve member having a flow passage formed therethrough for providing fluid communication between the inlet passage and the outlet passage of the valve body when the valve member is in the open position; and

a seat assembly extending about the inlet passage and engaging the valve member, the seat assembly comprising:

an annular seat carrier having an annular groove formed therein; and

a seat positioned in and extending from the annular groove of the seat carrier, the seat having an inner side, an outer side, and a seal ring having a distal end that is biased toward the inner side of the seat, the seal ring being engageable with the valve member to provide a seal when the seat assembly is acted upon by a pressure and the seal ring being deflectable in a radially outward direction resulting in a decrease in differential area thereby mitigating the effects of increased axial force applied to the seat assembly as the pressure increases.

24. The valve of claim 23 wherein the seal ring is engageable with the seat carrier to limit outward deflection of the seal ring.

25. The valve of claim 23 wherein the seat carrier is made of metal and wherein at least a portion of the frusto-conical surface of the seat carrier is sealingly engageable with the valve member in the event of destruction of the seal ring.